

# The AQUARIST AND PONDKEEPER

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## Editorial

ALL good books on aquarium-keeping have a section giving advice on the treatment of fishy ailments and maladies. This, the author has thought, will ensure that the reader of my book will have by him what he needs to know in times of trouble. Unfortunately, the presence of descriptive lists of fearsome-sounding diseases in a book that started off by extolling the joys of fish-keeping sometimes acts as a deterrent to a prospective beginner, as a lady contributor to this issue suggests from her own experience. Of course, to be frightened off in this way is really to act as illogically as the man who decided not to purchase a Rolls Royce, when the deal was nearly complete, on the grounds that the car must be unreliable because it was equipped with a tool-kit for repairs.

Fishes are no more unhealthy than any other kind of creature, although it is true that deaths of fishes apparently from disease are frequently the causes of discouragement to beginners. However, it is more often found that the complaint is in reality a trivial matter, and one from which the fish would probably have recovered or to which it would never have succumbed, if it had not been for the would-be aquarist's faulty management in overcrowding the aquarium, polluting the water with excess of food, providing an inadequate type of diet, and so on. These are factors which can lead to the "flare up" of a disease or parasitic infestation already present but in an unimportant degree. Fishes caught from natural waters are seldom free from parasites or signs of minor disease, but it is doubtful if their natural lives are shortened even fractionally by these unless some other major environmental change weakens their resistance.

Fishes can live for a long time despite incomplete feeding, and it is not necessarily right to assume that because deaths occur suddenly without recognisable symptoms that some obscure disease has been responsible, although too often this is done. Provided that the aquarist does not allow dirty aquarium conditions to prevail, does not overcrowd and provides an adequate diet, disease will not trouble his tanks.



Photo :

W. J. Howes

## Making the most of Aquarium Plants

by E. E. TOLEMAN

THE decorative tanks that are seen at shows often cause the aquarist to wonder why his own never seem to look quite the same. The answer, of course, is that a great deal of thought has been given to the arrangement of these tanks, and particularly to the choice of the plants used. So many people acquire new plants and plant them more or less haphazardly without paying sufficient attention to their habits and requirements or decorative effect, and are disappointed with the result.

Briefly, we may class the commonly available aquarium plants into two categories, those that grow rapidly, and those that are comparatively slow in growth. Most of those that fall into the first category are easy to grow, but will naturally require quite a lot of attention to keep them within bounds and looking tidy. The slower-growing plants, whilst usually not quite so easy to grow, are more desirable where a tank is to be set up for a long time with a minimum of attention.

Some aquarists have difficulty in growing a particular plant, whilst others grow well; the explanation is probably that conditions are suitable for some and not for others, and it is a matter of common sense where decorative tanks are concerned to rely only on those that are known to grow well. If the growing of the more-difficult plants is a challenge then these are best kept in special tanks until the successful technique of culture has been achieved.

The relative size of plants is often overlooked, and if large and small plants are mixed indiscriminately not only is the resulting appearance of the tank poor, but the smaller plants will probably suffer in competition with the larger ones. For example, whilst an Amazon sword plant (*Echinodorus intermedius*) of small size looks quite good, when it grows to its maximum size the effect is rather overwhelming in all except the larger sizes of tanks.

Colour, too, must be borne in mind, for whilst most aquarium plants are green they nevertheless show a diver-

sity of shades, and by skilful planting the most can be made of this feature. Habit, too, varies greatly; some plants are more or less upright in growth, others spreading, so that the ground area that will ultimately be covered must be visualised when planting.

The use of rock can help to enhance the tank's appearance, but must be used in moderation, especially in smaller tanks. A point that must be remembered, but which is often overlooked, is that the more rock used then the less water there will be, a vital matter when it comes to stocking the tank with fishes. Selection of the rock must be done with care and precautions taken not to introduce those that may possibly be harmful to both fishes and plants.

Obviously tanks must be arranged with the occupant's habits in mind—it is not much good making a banked-up effect with rocks and plants and then introducing such fish as catfish, who will very soon re-arrange the lay-out to their own satisfaction! Weak-rooting plants such as *Eleocharis* (hair grass) are not advisable where fish that are continually rooting on the bottom are kept, nor are heavy surface plants desirable for fishes whose beauty is revealed by the light coming from above.

The respective colours of fishes and plants must also be considered, and generally we can say that light-coloured fishes show better against a dark-green background and vice versa. A contrast of fish colours is usually effective and the colours of many livebearers do much to brighten the tank. Fishes should be of more or less the same size, and plants in relation too, for tiny fishes swimming against a background of large-leaved plants never look so good as if the plants are of a smaller relative size.

Let us consider first the easier and quicker growing plants; those commonly available include *Ambulia*, *Cabomba*, *Ceratopteris*, *Elodea*, *Hygrophila*, *Ludwigia*, *Myriophyllum*, *Synsphaera*, *Sagittaria* and *Vallisneria*. Most of the species of these genera that are available grow fairly easily,

and where conditions are good tend to become rampant, necessitating a system of pruning to keep them under control. This can be a nuisance if the time available for maintenance is limited, but it has its advantages, for a tank wherein the plants are thriving generally also has healthy fishes. This is particularly so with those fishes whose habit it is to swim in and out of the plants, and those of a retiring nature. If this type of plant is used then the best effect is obtained if fairly large clumps are planted, as single specimens haphazardly placed never have the same effect that is achieved by a bold mass of one species.

The plants mentioned vary much in size; for example, *Hygrophila polysperma* is fairly small and can be kept within bounds by judicious pruning, whereas the giant *Hygrophila stricta* needs a very large tank to grow properly and make the magnificent plant that it can be. Obviously then we must choose plants that are of a similar size.

Some aquarists favour planting only one species in a tank, and this can give very attractive results. A striking effect that can be obtained this way is to use the twisted *Vallisneria* (*Vallisneria spiralis* v. *torta*) planted in groups at the sides and along the back of the tank, and to have albino swordtails, red platys and black mollies as the occupants. Some may say this is a somewhat crude contrasting of colours, but nevertheless it does occasion very favourable comment, especially when the tank is brightly illuminated from above.

In this group of the fast-growing plants we must include the free-floating aquatics such as *Azolla*, *Ceratopteris*, *Lemna*, *Limnobium*, *Pistia*, *Riccia* and *Salvinia*, but unless shade is required for a definite purpose it is preferable not to use these in a decorative tank. If light is cut off from the other plants underneath then these tend to become more straggly in growth, and in the less intense light the fishes do not usually show up so well.

The second group of much slower-growing plants gives the aquarist considerable scope in setting up a tank requiring much less attention, but naturally these plants are not generally so freely available. They include species of *Anubias*, *Aponogeton*, *Echinodorus* and the now numerous species of *Cryptocoryne* that have become available for aquaria. A large tank planted with bold groups of suitable *Cryptocoryne* species is most effective, and with good treatment will last for a very long time with little attention to the plants. But here again we must remember that some



A subject for the larger aquarium is *Aponogeton ulvoceus*—in this specimen, painted at Shirley Aquatics Ltd. by R. B. Sylvester, the flower is seen

species, such as *Cryptocoryne ciliata*, are eventually large, and others are very much smaller. Some uncommon species like *C. retrospiralis* have leaves unlike the more usual types, and when this species becomes more readily available it will undoubtedly prove a first-class plant in all respects for aquarium growing. The colours of the leaves of the various species vary considerably, as also do their shapes, and a striking effect can be obtained by a careful grouping of the contrasting types. Not all the *Cryptocoryne* species now being sold are suitable for aquarium culture, and it is advisable to use only those that are known to grow readily.

The use of such plants as *Anubias* and *Echinodorus* and some species of *Aponogeton* must be made with care, as most grow to a large size and are really only suitable for the larger tank. The former particularly is most desirable, although at present is somewhat rare and expensive, but it is a tough plant that will grow slowly for many years before taking up more than its share of space.

Where a tank has been set up with plants for some time, occasionally for no obvious reason the plants start to look sick; this happens particularly with *Cryptocoryne*. The probable explanation of this is that certain foods required by the plants for their well-being have become exhausted and need replacing. So long as the growing medium is not fouled then the removal of part of the water and replacement with fresh often is all that is required. There are on the market now special plant foods for aquarium plants, and these are usually quite good so long as they are used in accordance with the maker's instructions, and are not used to excess.

(Please turn to page 124)

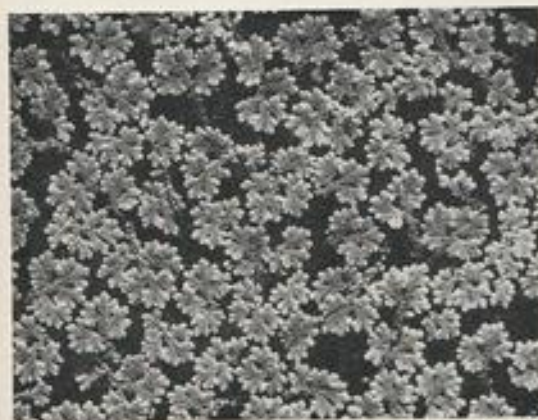


Photo: Laurence E. Perkins

Seen from above the water surface the tiny plants of fairy moss (*Azolla*) form a pattern worthy of admiration

## COLDWATER FISH-KEEPING QUERIES answered by A. BOARDER

Can you please tell me the procedure for culturing *Daphnia*? I have an outside pond and an aquarium.

It is not an easy task to culture and maintain a good supply of *Daphnia* under artificial conditions. These crustaceans usually breed in rather foul ponds especially where ducks are kept and cows drink. You will not be able to breed any *Daphnia* in a pond which contains any fishes or other fairly large forms of life. If you have a spare pond clean this out well, and ensure that there are no *Hydra* or other pests which could eat the *Daphnia*. Then when water is added a good quantity of old cow manure, decaying lettuce leaves and potato peelings can be placed in the pond so that a large amount of bacteria, Infusoria and rotifers will breed. A few water snails will help to break down the vegetable matter. When the water contains plenty of small life a few *Daphnia* can be introduced. They will multiply rapidly if the conditions are right. However, as they eat up the food there, you will have to see that more is added.

Sometimes a pond which has a very good supply of *Daphnia* will become clear and empty of them for no apparent reason. Most pondkeepers who cultivate *Daphnia* use two ponds, so that when one fails the other can be brought into use. You will find it much easier to breed white worms, and these are also good food for fishes. Why not buy the "Aquarist" book, *Fish Foods and Feeding*, 4s. 10d., post paid from *The Aquarist*. This deals with all subjects pertaining to breeding live foods.

I am a newcomer to fishkeeping and have a small pond in my garden. I now wish to make an aquarium but do not know which glass to use. Can you help me please?

It is not an easy job for a beginner to glaze a tank. Old hands may smile at this, but it is a fact that many people make a mess of their first attempt. It is far better to buy an aquarium from an established firm, such as one advertising in *The Aquarist*, instead of trying to make one yourself. However, if you prefer to do so it is important to get the correct measurements for the glass for a start. The base goes in first, then the sides, and finish with the ends. Do not forget to allow for the thickness of the glass when making your measurements. For a small tank 22 ounce glass will suffice, but for any length of glass 24 in. or more in length it is necessary to have quarter-plate glass. Thin glass is liable to crack if the tank gets a knock when it is filled with water.

Will you please give me instructions as to how to start an aquarium and what is needed?

To give you all necessary instructions would fill a book. Fortunately, one such book is available at a cheap price. Send 2s. 10d. to *The Aquarist* for *Coldwater Fishkeeping*, and you will find in this book all you need to know to make a good start.

I recently bought some plants of *Vallisneria spiralis torta* and *Egeria densa*. They appeared quite healthy when they arrived. I planted them in my tank and now the *vallis* is losing its leaves. They turn brown at the tips and then fall off. The *Egeria* is doing well and has grown up to the top of the tank. Can I cut the ends off and re-root them?

It is probable that the *vallis* is not thriving because you already had plenty of plants growing in your tank. Their roots will have occupied most of the space in the compost and so the *vallis* did not get a chance to get a sufficient supply of nourishment. One can hardly expect to plant another plant right among the roots of other strong-growing plants and get the new introduction to grow. *Egeria* is rather different, as it has not got a root system like the

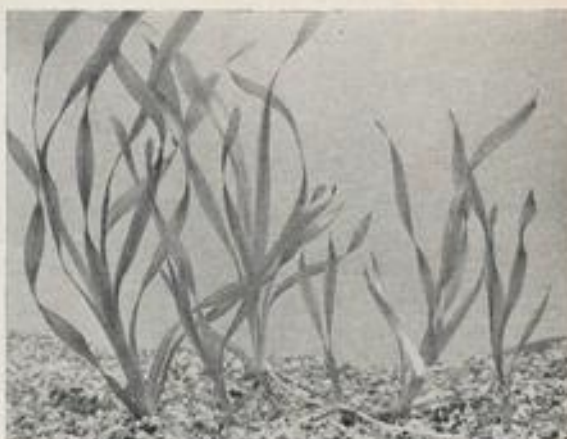


Photo:

Laurence E. Perkins

Twisted vallis (*Vallisneria spiralis* var. *torta*). Some of the runners from which new plants are arising are seen in the foreground

*vallis*, and can send out roots all the way up the stem and so obtain some nutriment in the water. When introducing a plant such as *vallis* into a tank already occupied by other plants it is necessary to get the new plant well rooted in some medium in a separate container, then to clear a space in the tank and plant the fresh one together with the soil around the roots.

You can certainly cut the *Egeria* down and the cuttings will make fresh plants. The old stems will send out new shoots and become more bushy.

I am able to buy a large second-hand bath in good condition. Would this be suitable to sink in the garden to make a small pond or would it crack in cold weather?

It would be possible to make the bath into a small pond in your garden. These baths are quite strong and it would take a very severe and prolonged frost to crack one. However, you could always relieve the pressure of ice by making holes in the layer each day. Unless the ice was allowed to remain very thick in the bath I do not think that you will have any chance of the bath cracking. Try to melt any ice around the edges of the bath with a little hot water.

I have a pond in the garden of a fair size with a pump giving running water over four cascades. I have a lot of green algae in the water. I understand that if the water was more acid the algae would not thrive. Is there any means of getting the water more acid, say by the use of peat?

You could have some peat in a rather open-meshed bag in one of the small ponds of your cascade. Then when the water is running it can percolate through the peat and will no doubt give the desired effect.

My pond is very green. Is it likely to clear by itself when the water plants grow?

It is quite possible that the water will become much clearer once the water plants grow well. It is rare to find green water in an established pond where there is a good quantity of growing water plants. Plenty of light on the water will always encourage the green algae to form. These kinds of algae will never grow in a dark place and any water completely screened from light will have no green algae in

it. It is difficult to screen a new pond completely at first and so the algae form. Once other water plants grow they gradually choke out the algae. A number of water-lily leaves on the surface of the water will help to provide some shade as would also some duck weed. Be patient for a little longer and the water will clear.

Could I keep veiltails in an aquarium with an inch of peat at the bottom? I do not want the water in the tank to turn green.

There is no reason why veiltails should not thrive in such a tank. They are not particularly fussy about whether the water is alkaline or acid.

I have a fairly large pond in the garden with a number of fishes of various species. Recently, during thundery weather the large fishes came to the surface and appeared to be in

trouble. What is the reason for this and can I do anything about it?

The large fishes are at the surface because they are not getting enough oxygen from the water. During thundery weather pond water can become dangerous through lack of oxygen, as when warmer it holds less of the necessary gas. The large fishes are always the first to show trouble in a pond as they require more oxygen than smaller fishes. You should change a large quantity of the water. If the fishes are seen in trouble again run the hose in the pond for a time and they will soon recover and be none the worse for the treatment. It may be that there is too much decaying vegetation or uneaten food in the pond. This causes poisonous gases to form and which deprive the fishes of the necessary oxygen.

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## Aquarists All

by MORRIS GLOVER

"COMIN' out, sir? We'm catchin' tadpoles for Open Day." Raymond, plump, bespectacled, persuasive, anxiously awaits my reaction. It is a half-holiday, and the hot sunshine calls from beyond the mullioned windows of this ancient mansion, now the home of 80 backward boys. I think of letters to be written, lessons to prepare . . .

"Come on, sir—you promised!" Did I? Well, after all . . . "Right! Meet me in the drive in 5 minutes' time."

I find them waiting for me: Ray, the precocious, overgrown child, with Terry, slight, fair, retiring, obviously the junior partner. Both wear Wellington boots and carry string-handled jars begged from the kitchen. We move out through the wrought-iron gates and along the high-banked lane lush with all the growth of spring and summer. A tractor approaches bearing the farmer's eldest son; above the din of the engine we exchange passing remarks about harvesting prospects. Then in by a gap in the hedge, the boys lithely negotiating a festoon of barbed wire which narrowly misses the back of my neck. In a dip of land below the farm lies the pond, a green-scummed, reedy area from which protrude some dead branches and a couple of rusty cans.

My charges fill their jars. "I'll look for the net, sir: I'm the only one as knows about that one." With clumsy cunning Ray pokes about under a reed-clump, the water just failing to overtop his Wellingtons. An odour arises confirming my suspicion that the farm sewage eventually finds its level at this spot. The net discovered, it is slowly drawn around beneath the surface, and finally brought to bank, to be turned inside out and the slimy contents deposited on the earth.

"Gurt big 'uns, sir," remarks Ray. "Do 'ee think they'm frog's or toad's?" I hazard the opinion that they might turn out to be toads. The three of us avidly search the slime for the fat, wriggling creatures, dropping them into the jars when found. Our first bag is 25. Ray is encouraged to enthusiasm; Terry says nothing, but silently contemplates the tadpoles swimming around in their new environment.

Several more soundings yield further substantial contributions. The bank is now bright green with lumps of

pond weed, while the population of the jars becomes more and more congested. After a catch that totals 35 our luck runs out, and we descend to tens and half-dozens. The fishers seek fresh fields over by the other side of the pond. First Terry and then Ray step into pot-holes and receive the smelly emulsion in their boots to the accompaniment of pained protests.

"My socks is all wet, sir," complains Terry, discomfort compelling speech. Too late in the day a vision rises before my eyes of stinking stockings and a wrathful matron.

"Never mind," I reply with false cheerfulness, "You'll be having clean things and a bath to-night. But don't get any more water in your boots!" Terry promises obedience; Ray the headstrong is inclined to risk another wetting. I look at my watch and find inspiration.

"Getting on for tea-time now—we'll be late if we don't pack up." Even the lure of the pond cannot supplant the stronger call to feed: the more backward the boy, the larger the appetite, or so it seems. We collect our gear, and make for home.

"That's 20 . . . 32 . . . 57 . . . 135 in they two jars," calculates Ray, on the way back. "Now if we sells 'em on Open Day at ten for tuppence, how much money shall us make?" Terry ventures an approximate answer which is astonishingly near the truth. Both boys are intoxicated with success: they could not have a greater sense of achievement if the profits were to run into thousands. And as for myself—it must be years since I spent an afternoon fishing for tiddlers!

Of course, Raymond and Terry never got as far as actually selling their tadpoles on Open Day. Last week I went into their dorm. and saw—well, a dozen or so well-developed specimens revolving lazily round in a big aquarium jar. They had all acquired legs: and they were all frogs!

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## Photographic Competition

**A**MATEUR photographers are invited by the Southend Aquarium (Pier Hill, Southend-on-Sea) to submit snapshots of fishes taken at the Aquarium this season for a competition with prizes of £30 (first), £15 (second) and £5 (third). Judges of the best pictures will be the photographic firm Kodak Ltd. Any number of entries can be made, provided that no more than two of the pictures submitted were taken on one day. Closing date of the competition is 24th October next, and names of winners will be announced in *The Aquarist*. A leaflet setting out the conditions of entry is available from the Southend Aquarium.

## Microscopy for the Aquarist—44 *by C. E. C. COLE*

**A**FTER staining, when this is desirable, we need to draw out every vestige of water from our preparations before mounting, while still preserving them as near to their original shape as possible. For this reason we need to proceed cautiously, and subject the object to several dehydrating solutions, each one stronger than the preceding one until maximum strength is reached.

You will remember that I said the duration of the action of any given solution can be checked under the microscope simply by keeping close observation upon the solution in the vicinity of the object. When no further movement is visible it is safe to assume that the strength of solution in or on the surface of the object is equal to that outside the object: a state of equilibrium has been reached.

Then and only then is it time to transfer the object into a stronger solution, and immediately this is done the same action—the drawing out of the weaker solution in an attempt to re-establish equilibrium—is apparent. Eventually there is almost no water left in the tissues, which are now ready for the next operation.

### Making the Specimen Transparent

Known as clearing, the object of this stage is to render the tissues more transparent, and it is indeed a surprise to many beginners to discover to what a great extent this is successful. The subjection of a dehydrated specimen to various "clearing" agents—easily and cheaply obtainable—can, if overdone, destroy their own purpose by adjusting the refractive indices to approximately that of the mounting medium, so that light passes straight through, revealing no detail at all.

If such is your experience—you leave unstained tissue too long in the clearing agent—further processing to remove the excess is necessary.

Try the following experiment: obtain a little clove oil and a mayfly larva. This creature is normally semi-transparent.

The clove oil will not operate satisfactorily until the larva is dehydrated. Proceed therefore to immerse it in dehydrating fluids in the strength of 30, 50, 70 and 90 per cent. Only then immerse it in a drop or two of clove oil unless you wish to prove the accuracy of the above statement, of course.

Place the specimen in the oil upon the microscope stage and watch. It grows more and more transparent; its internals become increasingly clear, after its muscles have shown themselves and faded away. Leave it for an hour or more and re-examine it. It is now almost invisible.

We have overdone soaking in the clearing agent. Now place it in a few drops of xylol. Gradually this replaces the clove oil and once again we can make out details of the corpse. We can repeat the successive immersions as many times as we like without damaging or dissolving any part of the creature. Xylol has a lower refractive index than clove oil.

### Clearing Agents

It is obvious from the above that it depends largely upon what we wish to see how long the immersion in the clearing agent should be. Other useful clearing agents are rectified spirits of turpentine, cedar-wood oil, lacto-phenol and Euparal Essence.

A small quantity of each of these should be obtained if you intend to go ahead after reading all I have said so far about preparing material for making your own slides.

We shall not need the same agent for all our subjects. There is a general rule to be observed, however, which it is as well to remember, and to which I know no exceptions.

To make our specimens more visible we shall need to use clearing agents which have refractive indices lower than our mountants (we discuss these next month).

But to increase transparency, employ media with refractive indices higher than those of the mountants.

The refractive indices of the clearing agents I have listed are as follows: 1, Turpentine, 1.470; 2, cedar-wood oil, 1.510; 3, lacto-phenol, 1.440; 4, Euparal Essence, 1.484; 5, clove oil, 1.533; 6, xylol 1.497.

## It's Two to One Against the Amateur

*by J. L. KELLY*

**T**HE Federation of Northern Aquarium Societies recently took a poll amongst its members on whether future show entries would be single fish (as has been the case) or pairs of fish. The voting for both sides was pretty even. The eventual outcome of this poll was that in future shows pairs of fish will be the rule, with the exception of fishes that are hard to sex, the latter keeping to single fish entries.

On looking through the schedule at the recent Midlands Show, of the 26 classes for tropicals, three classes are for six fish, eight for single and the remainder pairs, so it looks as if the last-named is to become the future ruling.

The main argument in support of pairs seems to come under two headings: (a) that the aim of the aquarist should be to promote the continuance and spread of the hobby, and (b) to improve by selective breeding the standard of fish-keeping throughout the world. This, it is claimed, cannot be done with only one fish, hence the need for two in future exhibitions.

Surely these are the aims of everyone who aspires to be a keen amateur aquarist? But let us look at the other side of the picture. How many beginners to the hobby have pairs of fish worth showing? Many a keen professional fish-keeper of to-day owes his continued enthusiasm to prize cards he won at table shows in his early days. The thrill of winning in open competition is a great shot in the arm for the promotion of keenness amongst society members, yet to insist on this new rule is to put a stop to many a would-be exhibitor.

It is all right for the professional breeder and established aquarist, who have the pick of many tanks, but surely we are not going to be deprived of seeing the many wonderful fishes exhibited in the past as individual entries? In most cases the entry was probably the only fish of that class that the exhibitor owned.

Coldwater fishkeepers, too, will be affected. After late summer (as we all know) it is almost impossible to sex goldfish. So the state of affairs must arise (if the new ruling is to be adhered to) when coldwater entries are single fish in the winter months and pairs in the summer!

Fish that are constantly jumping about the show tank cannot be judged properly, yet putting pairs of livebearers together, to mention just one instance, is just asking for this activity to arise.

What about the rest of the exhibiting pet world? Do the officials at the famous Cruft's Dog Show insist on a dog and a bitch being shown together? Or the National Society of Cage Birds insist on a pair of birds in their shows? Of

*(Please turn to page 123)*

## The Garden Pond in September *by* ASTILBES

**M**ANY of the water lilies will have passed their best by now, although there may be a few more flowers. The wonderful succession of flowers all through the summer has helped to make the pond an attractive feature of the garden. It is hardly possible to imagine a beautiful pond without at least one or two water lilies. If all the dead flowers are removed soon after they die it will always encourage fresh flowers to open. Some of the leaves will also have to be removed as when they change colour they are on the way to decay. It is surprising how much pollution can come from the decaying leaves if they are left for long in a small pond.

Mention of a small pond brings the query, "What is a small pond?" To the owner of a large estate a small pond may conjure up visions of a very different type from those of one who owns a small back garden. Small ponds can range from a kitchen sink in the ground to a pond of 12 ft. by 8 ft. Where there is enough space in a garden there is no doubt that it is far better to make a pond a fairly large size in the first place as the smaller the pond the harder will it be to keep it in good running order for ever after.

To keep a pond in good condition it is necessary to be able to reach most of the water fairly easily. This means that if a pond is to be fairly large it should be long and narrow so that no point in it is more than 8 ft. wide, although the length can be anything which can be made in the garden. A pond 12 ft. long by 8 ft. wide would be a very good size, and maintenance of it would not be too difficult. It would be possible to reach any part of the pond with an ordinary landing net, for catching any fish, and a cutting knife for pruning could be tied to a stick so that unwanted leaves could be removed.

Where a pond is circular there is likely to be an awkward spot at the centre which is difficult to reach, and so a pond which is more kidney shaped presents a better proposition

as far as accessibility is concerned. For a large garden a pond in the shape of a cross would be extremely useful and attractive. It would be possible to make divisions so that any of the four arms could be partitioned off if needed.

Such a pond could have some or all of the arms of varying depths. For instance the centre could be the deepest and the arms could gradually decrease in depth to be fairly shallow at the ends. The depth, at the deepest, can be about 2½ ft. to enable the fishes to have at least one part in which they can find some shelter during very cold weather. The shallows would make very good spawning areas and no part of the water would be too wide. It would also be possible to insert partitions so that different kinds of fishes could be kept apart; such carnivorous fishes as perch and pike could have a part to themselves and goldfish would be safe in the other arms of the pond.

So many pondkeepers make a tiny pond when they first start and then later on they wish that the pond was larger. It is not an easy task by any means to increase the size of an existing pond, and it is better to make another pond near by and try and connect the two by a small channel. The join, however, must be carefully made at the old-pond end, as it is almost impossible to get fresh concrete to join up with old.

The very small pond is likely to be difficult to keep in good condition, as in the summer the water can warm up to a high and dangerous level and in the winter it can become very thickly covered with ice. In a small pond after a short time a water lily will grow to such an extent that all the water surface is covered with leaves, and the beauty of the pond is lost. It is possible to obtain water lilies for varying depths of water but their growth is also dependent on the amount of space and nourishment available. A water lily in a very small pond with little nutriment may produce leaves of 2 in. across and flowers no larger than a five-



Photo :

A Hampshire garden pond of neat design with central fountain

W. J. Howes



Photo :

Laurence E. Perkins

Two ponds can be joined by a waterfall and continuous circulation is achieved by a pump which lifts water from the lower to the upper pond

shilling piece, but put the same lily in a larger pond with some good loam to feed on and it will form leaves 6 in. or more across and flowers of at least 4 in. across.

Towards the end of September it will be necessary to make sure that the fishes in the pond are given extra food. It is possible in a well-run pond to with-hold all artificial food during the summer months, but later in the year the natural sources of food may fail and it is then necessary to give something extra. If the fishes are well fed in the autumn then they are able to store up nourishment to enable them to go through the winter in better condition. Not that most pond fishes do not feed during the cold weather but they eat far less and so the stronger and fitter they are in the autumn the less likelihood is there of fungus and similar diseases attacking them in the early spring.

Plenty of garden worms can be offered and some stale brown-bread crusts will also be acceptable. These bits of bread thrown on the pond give a useful indication whether the fishes are on the feed or not, and there are very few types of fishes which are kept in garden ponds which will not rise to a piece of brown bread when they are hungry. Only a small portion should be given at first and never more if this is not taken within 2 or 3 minutes.

If there are any small fry in the pond from the season's spawnings these should have some food small enough for them to take with ease, and this should always be given in a shallow part of the pond if possible. Do not trouble to catch these small fishes to winter indoors in small tanks; they are likely to go through the winter in the pond much better, especially if there is a fairly dense growth of water plants somewhere in the pond. The plant known as Canadian pond weed, *Elodea canadensis*, makes a grand shelter for young fishes when it is well established. It has often been said that goldfish have to be 3 in. long to enable them to winter safely out-of-doors. This is not so, as goldfish half an inch in length over all have been known to

winter out safely even in shallow tanks with a depth not exceeding 9 in. It is not the cold which kills these fish in the winter but foul conditions in the pond, which cause an excess of bad gases often trapped in the water by a covering of ice.



THE AQUARIST



# GIANT TOADS

by ROBERT BUSTARD (*Photographs by the author*)

**T**HERE are a number of toads which are covered by this title but the species which always comes to mind first is the marine toad (*Bufo marinus*), which is perhaps better known by its alternative name of South American giant toad. This large toad, with a snout to vent measurement of 6 in., is truly a giant, and until recently was considered to be the largest toad in the world. This title is now given to *Bufo blombergi*, which is very much larger and is also from South America.

The South American giant toad is always available in this country and has been popular among vivarium-keepers for several generations. This popularity shows no sign of waning. Provided that it is supplied with sufficient warmth—the South American giant toad should never on any account be allowed to hibernate—it lives well in captivity, requiring little attention.

Some people describe toads as ugly, but personally I have always looked on them as most attractive. The huge eyes of this species, with their golden iris, are really beautiful. The general coloration above is brown, this gives way to a lighter colour on the sides and below the colour is a dirty white. Like our common toad (*Bufo bufo*) this large relation has a warty skin, and in this species the parotid glands behind the eyes are well developed. These glands exude the whitish poisonous liquid which causes a dog or other animal to drop a toad quickly.

Another species which is quite frequently available is the

leopard toad (*Bufo regularis*). There are a number of races, of which the largest and most attractive is *Bufo regularis pardalis*, which is found in the Cape Peninsula in South Africa. The leopard toad has a very wide range, over nearly all tropical and South Africa, and has the distinction of being the largest African toad. *Bufo regularis pardalis* measures about 5 in. and frequently exhibits a dark chocolate ground colour. This is intersected by numerous golden-yellow markings which form a network on the back, sides and also the limbs, making it very handsome. As in *Bufo marinus*, the parotid glands are very noticeable. Below the colour is grey-white. It is accustomed to cold weather, at least in the more southerly parts of its range; however, I do not recommend that it be hibernated. A temperature of 60° F. is suitable throughout the year. The temperature for the South American giant toad should not fall below 60° F. and I recommend 65° F. as a suitable temperature for this species.

These two large toads can be kept together in the same vivarium. The vivarium for either of these toads must be roomy and certainly not less than 24 in. by 12 in. by 12 in. The ground covering can be of soil with moss in places. *Bufo marinus* will not require any additional hiding places as it will burrow down into the soil or hide under the moss. The leopard toad should be provided with a suitable hiding place behind a large stone or log.

The vivarium should contain a water dish, which should



A flashlight photograph of the leopard toad (*Bufo regularis pardalis*) as it forages for its food at dusk.



South American giant toad (*Bufo marinus*). This giant does well in a vivarium

be large enough for them to submerge. Neither of these toads will spend long in the water, and the vivarium, although not too dry, should not be as damp as would be recommended for frogs.

Any insects will be accepted as food and also large earthworms. It is a good idea to sink a shallow dish into the soil, and in this gentles and mealworms can be placed. The dish prevents their escape before being eaten. Blue-bottle flies will also be accepted, as will larger insects such

as cockroaches. Like the bull frogs discussed last month, these toads have appetites comparable with their size and the basic diet of most captive specimens is large earthworms.

Both of the species mentioned are specially recommended, the South American giant on account of its truly enormous size and the leopard toad because of its very attractive coloration. I always have specimens of both in my own collection and they are firm favourites of mine.



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*The Book of the Garden Pond* by G. F. Hervey and J. Hems. 192 pages; illustrated. Stanley Paul & Co. 16s.

THIS is the third book on aquatic subjects to appear by these two authors, who are both well known to aquarists. In their Preface they declare this book to be their "swan song," but it does not live up to what might be expected from the use of this phrase when it is compared with their earlier books. However, it is in fierce competition in such a comparison, and perhaps should be contrasted only with other published books on the garden pond to assess its true worth. It deals with pond construction and maintenance, fishes and plants for the pond, including

marginal plants, and an interesting history of the subject is given. Sound practical advice is offered in all of these matters, backed by some clear line illustrations and eight plates of fine photographs.

The authors' style of writing has spoiled this book for the reviewer, for although they have made obvious and successful efforts to enliven the text these have at times also laid them open to the charge of flippancy (pages 27, 34, 37, 151). A few Latin tags could have been omitted without loss, and authors who include in their Preface phrases in Greek without a translation deserve to have as readers only those few savants who can understand it; this more particularly so when they add a word to their own language as dreadful as "revivication" (page 49)!

It is to be hoped that the paragraph on evolution (page 126) will not be taken seriously by any reader. Man's chromosomes are usually said to number 48, although more recent work puts them at 46, and they are certainly not 42 as stated on page 157. Mis-spellings noted are of *Urodela* (page 150), vitelline (page 158) and mitochondria (page 159). Altogether it is perhaps not *the* book of the garden pond but one which pond-keepers will want to have and which will without doubt meet most of their needs.

ANTHONY EVANS.

# The Assiduous Argonaut

by LAURENCE E. PERKINS (Photographs by the author)

THE aquarist with an all-round interest in his hobby may be strongly recommended to obtain a pair of our native water spiders (*Argyroseta aquatica*), which will amply reward him for the little attention he may give them by affording him abundant interest and several families of youngsters.

The argonaut, as this creature is commonly called, is unique in being the only spider which virtually lives under water, although it is equally suited to a terrestrial existence and frequently leaves the water to search for prey on land when there is a dearth of aquatic food. A very small aquarium or even a glass jar will suffice to accommodate a pair of these interesting creatures, provided that suitable sprigs of underwater plants are supplied to aid them in their house-building operations.

When first introduced to new quarters the water spider soon settles down and will begin to construct a diving bell almost immediately. Firstly, having selected a suitable clump of foliage, a silken awning is spun between adjacent leaves or fronds. The spider then rises to the surface of the water, where it raises its abdomen and hindmost legs out of the water in order to trap air among the downy hair covering its body and legs. Once below the surface again, its body enshrouded with a bubble of air, it assumes the appearance of a globule of mercury as it heads back towards the recently built canopy of silk underneath which it now releases the bubble of air. This operation is repeated several times, interspersed with periods of silk-spinning, until the diving bell is complete and ready for occupation. Entry is gained from the underside, the spider merely forcing its way through the water skin under the collected bubble of air.

The diving bell is never shared by adults, male and female each constructing their own individual bells near to one another. The female lays her eggs in a cocoon which she houses in the upper storey of her diving bell until the score or so young hatch out and disperse, each to build a little bell of its own.

The winter months are spent in hibernation and the bell is at first strengthened by the addition of sand granules and a further reinforcing with silk, the result being a very tough underwater cocoon which probably does much to counter low temperatures.



Water spider carrying a bubble of air to its underwater nest



Water spider inside its "diving bell", silvery with trapped air, made between the whorls of the water plant hornwort

Unlike all other common spiders, where the female always exceeds the male in size (usually to the fatal disadvantage of the latter, which is eaten by his mate after mating!), the male water spider is  $\frac{3}{5}$  in. in length against the female's  $\frac{2}{5}$  in.

Feeding on all very small forms of insect and crustacean life, *Argyroseta* is easily satisfied and seems as well contented with *Daphnia* as anything.

## It's Two to One Against the Amateur

(continued from page 118)

course they don't! Yet, their aims for the furtherance and improvement of their particular field must be closely allied to our aims.

This rule means the tolling of the bell for many an amateur where exhibiting is concerned. The powers that be who make these rules must have their reasons, but I beg of them to remember that if the future of our hobby is to be assured, every encouragement must be given to the beginner with his one tank and half-a-dozen or so fishes.

Society secretaries know this only too well, and most societies do give every encouragement. But what better than a prize he can proudly show to his relatives and friends (even if it is won only at a table show at his local society).

These are just a few points in support of single fish and, no doubt, you can think of plenty more. But I am firmly convinced that a happy medium to suit both sides can be arranged, to give the beginner and experienced aquarist alike a fair crack of the whip.

The gauntlet has been thrown down. Is there any upholder of pairs of fish willing to pick it up and give us his version as to why pairs are better for shows than just single fish?

It's odds of two to one against the amateur at the moment.

## The Archer Fish

(*Toxotes jaculator*)

ORDER: Ostariophysi, from Greek *ostarion*—a little bone, and Greek *physa*—a bladder.

FAMILY: Toxotidae, from Greek *toxotes*—a Bowman.

SPECIES: *Toxotes jaculator*, from Greek Bowman, and Greek *jaculator*—a thrower.

VERY few aquarists in this country have kept archer fish, and none, so far as I am aware, has succeeded in breeding them. Consequently anyone who wishes to obtain a specimen or two is hard put to it. I know of nowhere at present from which they could be procured. Nevertheless I make no apology for including them in this series, for circumstances may alter at any time.

Someone, somewhere, may import a few, and it is equally possible that if this is done, one or more breeders, either by good management or a great deal of luck, will persuade a pair or two to add to their numbers. Then many aquarists will be able to see for the first time the remarkable habits of this fish, and its skill as a marksman.

A native of the Far East (Burma, Siam, New Guinea) it reaches a maximum size of 5 in. and is therefore by no means a "toy" tropical. In profile it has a comparatively flat dorsal outline, and a markedly convex ventral one. On its sides are six vertical black bars, the first passing through



the eye, and the last from top to bottom of the caudal peduncle. The primary colour of the body is silver or yellowish silver. Traces of black edge the fins.

Practically nothing is known of its breeding habits. Its interest lies in its remarkable feeding habits. It lies in wait beneath the water surface until a fly or other insect settles on an overhanging twig or leaf. In an aquarium this could be on the glass above the water line, or on plants which have grown out of the water.

Suddenly, the fish ejects several drops of water from its mouth with such force that they speed in the direction of the insect, and more often than not bring it down into the water, to fall an easy victim to the marksman.

If the first "shot" is not successful and the fly remains unmoved, a second or third rapidly follows until a hit is scored. Should the prey land a little too far from the shooter it is frequently snapped up by another fish more conveniently placed. No resentment is shown by the original fish, who just cruises around waiting the arrival of a fresh target.

In the absence of terrestrial prey, the archer fish will content themselves with ordinary live food.

Once tamed and used to the presence of human beings the fish are reputed to perform as often as flies are provided. If any show committee can procure a fish so acclimatised to exhibition conditions, and at the same time procure a plentiful supply of living flies, it would surely prove a great draw to both aquarist and general public.



Photo:

Laurence E. Perkins

The remarkable feeding habits of the archer fish are better known than its breeding procedure, which awaits description.

### Making the most of Aquarium Plants

(continued from page 115)

The question of how much of the tank space should be taken up by plants is a matter of personal taste, but sufficient space must always be left for the fishes to have room in which to swim in comfort.

Many of the furnished-aquaria exhibits seen at shows are undoubtedly overplanted; those that seem to catch the judge's eye usually have about half their area planted, and this would seem to be the proportion that gives the best results.

It is a good idea before setting up what is intended to be a permanent decorative tank to make a plan on paper of the lay-out, it is surprising how much help this can be. Plenty of time should be given to the actual planting, and alterations made as required so that the very best effect may be obtained.

Fishes and plants are complementary to each other, and by taking extra care in setting up our tanks we shall be well rewarded, both by personal satisfaction with the result, and the interest that such a tank will arouse when shown to prospective aquarists.

# Photomicrography for the Aquarist

by DUNCAN SCULTHORPE

(Photomicrographs by the author)

WITH the infinite fresh material available for microscopy, and the ability to use a camera, which I think many aquarists possess, the mastering of photomicrographic technique enables the aquarist to build up an interesting and useful record of subjects he has examined and perhaps mounted. The camera becomes invaluable for rapidly recording full details of slides of living specimens which either cannot be mounted or may easily be damaged during dehydration, etc. Quicker than drawing, it gives a more accurate rendering of details, and a better record of colour differentiation.

In describing photomicrographic techniques, I am taking the subject in the narrow sense, to denote photography through the microscope, thus excluding very low-power magnification concerned only with the surface features of opaque objects. As there are no standards to which one may refer, the techniques are not easy to master, and it is very much a case of being able to assess individual conditions of exposure, density of staining and filters required.

Although better results are naturally obtained from the technically superior microscopes, very satisfactory results will come from even a low-power student's microscope, and from all cameras except the simple "box" types. Since the amateur photographer is unlikely to possess a fully installed optical bench, I shall only describe simpler arrangements which I have found to be satisfactory. The microscope, preferably with all its accessories fitted, should be installed absolutely vertically on a stable bench or other solid base. Some people arrange the apparatus horizontally, but this isn't terribly useful when one is photographing fluid mounts. Now two laboratory stands are required—the type with flat base and a vertical rod on which slides a boss-head and clamp. With one on each side of the microscope, the camera may be securely fixed at the requisite level with its lens in close contact with the microscope eye-piece.

Plate cameras are the most convenient, because of the ease of focussing the object on the ground-glass screen for which the plate is substituted in the actual exposure. With folding and miniature cameras the microscope is adjusted as one would in looking at a slide in the ordinary way, and then the camera, set to infinity focus and with the iris at open aperture, is fixed in place above the microscope. The camera lens is not essential in image formation, and therefore if the lens is removable, so much the better. Throughout the setting up of the apparatus and subsequent exposures rigidity is essential, and vibrations must be avoided.

The ideal light source for photomicrography should have constant intensity over a small surface; the Pointolite direct-current lamp is very suitable, and for most exposures the 100 c.p. type of this tungsten-arc lamp will be adequate. Equally suitable for alternating current is the 6 volt, 108 watt ribbon-filament lamp operated from the mains with a suitable transformer. Both these microscope lamps give light of high intensity and may be bought installed in special well-ventilated lamp-houses which are fitted with iris diaphragms and filter holders, thus permitting photomicrographs to be taken under exceptionally varied conditions. I have found, however, that these refinements are unnecessary for good results, and there is always a greater feeling of triumph if pleasing results are obtained with modest apparatus. A ventilated lamp-house is to be

recommended at all times, and with the standard microscope lamps, 60, 75 or 100 watt bulbs of the pearl or better, opal type, are satisfactory.

Now, to summarise the optical system: light is beamed from the lamp on to the plane surface of the microscope mirror and is concentrated by the condenser beneath the stage through the slide. The image is then transmitted through the microscope tube to the photographic plate or film. The ideal lighting of the field is found by the usual adjustments of the lamp-mirror distance, iris diaphragm and sub-stage condenser. I cannot say anything more definite on these conditions as they are all so variable; however, some indication is given in the details of my illustrations.

Most photographic subjects encountered in this work will be of thin sections of plant and animal tissues, stained and then mounted in a viscous medium, such as Canada balsam, on a glass slide. Such slides should be photographed by transmitted light, but reflected light must be used for opaque objects, the microscope lamp being raised and the light concentrated by a bull's-eye condenser on to the surface of the specimen. Specimens mounted in fluid should, like transparent stained mounts, be photographed by transmitted light.

I am now going on to demonstrate specific examples for use with the apparatus and basic principles described and discuss exposure, filters and the use of different sensitive materials. An unstained mount may be recorded satisfactorily on orthochromatic material, but when the subject is dark yellow or brown, panchromatic film is required, often with a suitable filter to emphasise detail. Fig. 1 shows the "mask" which a damselfly larva, *Agrius* sp., uses to shoot out from beneath its head to catch prey. Mounted in Canada balsam, it was of a medium-yellow colour, and was photographed on Verichrome Pan film in a folding camera. The illuminant for this and all the other photomicrographs in this article was a 75 watt pearl bulb in a lamp-house, the light being passed through a ground-glass



Fig. 1

screen before reaching the mirror. Lamp-mirror distance was always 5 in. A 25 mm. objective was used for Fig. 1, and a  $\times 10$  eyepiece. Exposure was only 2½ seconds. In view of the unstained nature of the specimen, and the absence of a filter, the amount of visible detail is amazing; notice the fine edge of the claws, the spine-like hairs and the tracts of muscle tissue running longitudinally. A more pleasing result with unstained specimens is sometimes obtained by using dark-ground illumination, but to obtain good photographs with such conditions requires more than average skill.

Panchromatic material is essential when the slides are of stained specimens. If a film or plate with balanced colour-sensitivity is used the contrast may be enhanced by using filters, but more of that later. Plant sections involve the staining of the cell walls by soaking in a solution of the stain, for a time usually found by trial and error, and then dehydrating through a series of graded alcohol concentrations, the process being completed by clearing the specimen in clove oil or Cellosolve and then mounting. The stains used are usually red, such as safranin, or blue, as for example haematoxylin. Combinations of stains effect differentiation, the cell walls absorbing different stains according to their chemical composition. In sections and whole mounts of animals, however, a first stain is used for the nuclei and then a counterstain for the cytoplasm; further differentiation is obtained by using triple stains, giving brilliant results and necessitating colour filters. In contrast with the ordinary staining processes triple stains usually require strict time schedules.

Fig. 2 shows a transverse section of the stem of the fringed lily, *Villarsia nymphaeoides*, stained with Delafield's haematoxylin and safranin. At one point in the network of cells forming the typical aerenchyma of water plants, there can be seen a group of spiny growths which stained red—this is an idioblast and is composed of heavily liquified cells. It is a common phenomenon in *Nymphaea* petioles. The cell walls were stained blue by the haematoxylin and at bottom right the central stele of the stem can be seen with its vascular tissue containing large vessels empty of cytoplasm. Exposure here was 3 seconds with a 75 watt lamp,  $\times 10$  eyepiece and 1 in. objective.

Fig. 3 is a transverse section of the stele of a water-fern root, stained in acid fuchsin (magenta). Exposure was 6 seconds on H.P.3 film with a 75 watt lamp,  $\times 10$  eyepiece and ¼ in. (high-power) objective. Note the detail of cell-wall structure in this photograph; the large metaxylem tracheids are seen centrally, and two groups of smaller protoxylem elements at top right and bottom left.

Fig. 4 shows a section of a tube foot from beneath the arm of a starfish, *Asterias* sp., stained with Mallory's triple stain: 3½ seconds exposure was given with a  $\times 10$  eyepiece and 25 mm. objective. A light-yellow filter was used to give a more correct rendering of the colour differentiation on Verichrome Pan film. The numbered arrows show the colours as they originally occurred on the slide: 1, purplish mauve; 2, red; 3, blue. The use of a red filter emphasises the cells stained blue whereas a green filter shows up the red and mauve stain.

To take photomicrographs of living microscopic specimens, such as jerkily-swimming *Daphnia* or *Cyclops*, requires considerable patience. Cavity slides are more useful than ordinary ones, and there are several tricks which can be employed to slow specimens down. Strands of cotton wool successfully entangle swift *Paramecium* and other ciliates, and floating a few crystals of mild narcotics such as menthol or chlorbutol on the culture solution is effective with most species.

Fig. 5 is a photomicrograph of living *Volvox globator*, the colonial green alga. No filter was used and exposure was 2½ seconds on Verichrome Pan film, with the usual lamp,

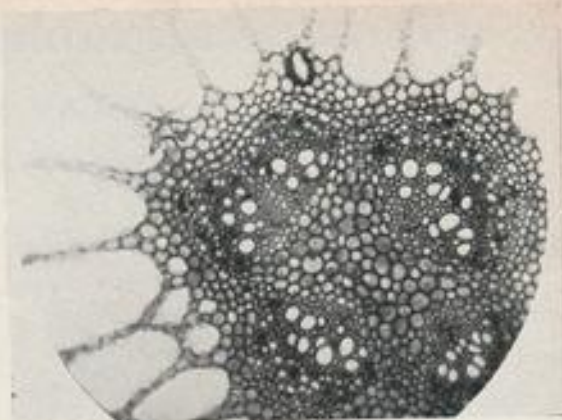


Fig. 2

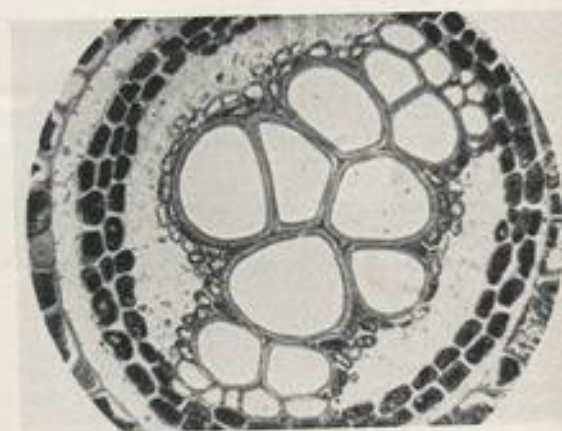


Fig. 3

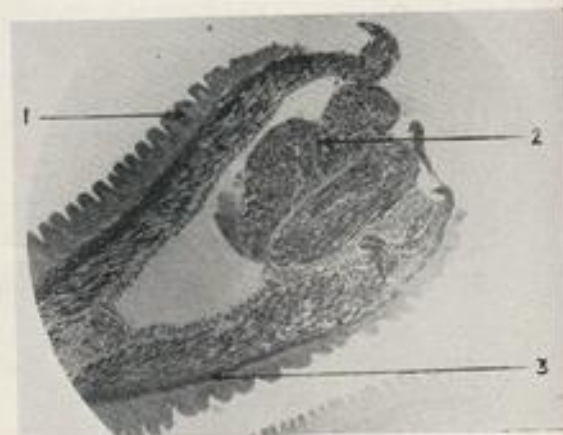


Fig. 4

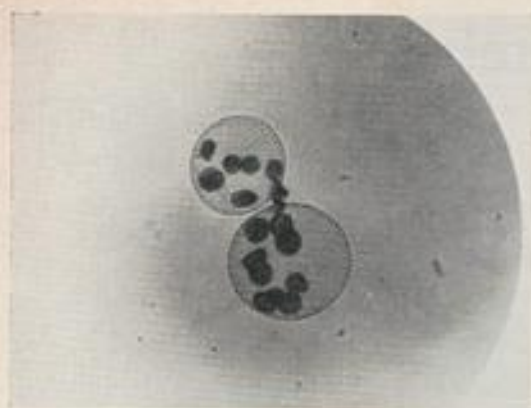


Fig. 5



Fig. 6

eyepiece and a  $\frac{1}{2}$  in. objective. Peripheral cells of the sphere are visible, and within the parent colony the dark daughter colonies can be seen. One of these in the larger sphere shows an intermediate stage in the "inversion" or "turning inside-out" that occurs in their development. Fig. 6 shows living *Daphnia* sp. photographed under similar conditions to Fig. 5. Antennae, eye, trunk appendages, gut and sculptured carapace are readily visible. In the right-hand specimen, near the break in the gut contents, note the heart appearing as an egg-shaped outline.

In selecting filters for photomicrography it is usual to emphasize detail in one colour and effect sharp contrast in another. For detail, choose a filter of as near the same colour as the area in which detail is required. For contrast use a filter of as near the complementary colour as possible. No filter will be ideal for both detail and contrast, but sufficiently close results will usually be obtained. General contrast may be obtained in most cases by the use of a medium- to light-yellow filter. Any filter should be placed between the light source and the specimen: preferably in the filter holder of the lamp, or that of the sub-stage condenser. Filters of glass of high optical quality are not necessary for average work.

Exposure is always difficult to estimate; although the light source may remain constant, the magnification, tube-

length, use of filters, density of the specimen and lamp to mirror distance are all variable. The beginner must put up with the frustration of experiment for a while, but if he keeps full records of all exposures the business becomes much easier, and he will soon be able to judge conditions accurately.

I recommend that the aquarist develops and prints his own photomicrographs. Plates are again convenient as they can be developed when they have just been exposed and the results are observed before further material is wasted. Simple M.Q. formulae are quite adequate and it is unnecessary to walk in the troublesome woods of fine-grain developers unless one is using miniature films. Prints should be made on normal bromide paper and glazed to improve the crispness of detail.

I recommend the following sensitive materials, and assure anyone that they will give excellent results with apparatus such as I have described.

Plates: (Ilford) F.P.4, semi-fine grain, F.P. Special, fine grain. Roll and miniature films: (Ilford) H.P.3, F.P.3, with increased red sensitivity; (Kodak) Ver. Pan., Panatomic X and Tri X. All photographs in this article were developed in Johnson Universal Developer and were printed on normal Kodak Bromesko paper.

### Aquarist's Calendar

6th-7th September: **Accrington and District A.S.** annual show at Town Hall, Accrington.

6th-7th September: **Oldham and District Aquarium Society's** seventh annual show at the Osram Social and Athletic Club, Shaw.

6th-14th September: **Southend A.S.** annual open show at the new Exhibition Hall, Southend Pier.

11th-13th September: **Bath Aquarist Society** annual show.

13th September: **Blackpool and Fylde Aquatic Society** annual open show at the Waterloo Road Methodist Mission, South Shore, Blackpool.

13th-14th September: **Wilkesden A.S.** annual show at Roundwood Park, London, N.W.6.

16th-20th September: **Leeds and District A.S.** annual open show at Trinity Church Hall, Trinity Street, Boar Lane, Leeds.

20th September: **East London A. and P.A.** annual show at London Co-operative Society Hall, 201, Ilford Lane, Ilford, Essex.

20th September: **Hendon and District Aquatic Society's** Film Convention, 6 to 9.30 p.m. at Whitefield Modern Secondary School, Claremont Road, Hendon, London, N.W.2. Admission: 2s. adults, 1s. children.

27th-28th September: **Federation of Guppy Breeders' Societies** annual show at Queen Mary's School, Basingstoke.

4th October: **British Aquarists Study Society** Conference, 1958, in London. Details available from secretary, J. E. Edwards, 42, Berrylands Road, Surbiton, Surrey.

31st October and 1st November: **Bristol Aquarist Society** annual open show at Bishopston Parish Hall, Bristol.

8th-9th November: **British Aquarists' Festival** at Belle Vue, Manchester.

12th-15th November: **Scottish Aquarium Society** annual open show at the McLellan Galleries, Glasgow.

# AQUARIST'S Notebook



by

RAYMOND YATES

**M**OST anglers start young and I think the same applies nowadays in the fish-keeping hobby. It is therefore for the benefit of the fancy in general if children are introduced to the mysteries of fish-keeping at school in their formative years. Children are interested in anything alive and fishes are not excepted. Few classrooms are without some form of livestock during the year and many have fishes on view for a time, at least. The goldfish is far and away the most popular, for the obvious reason that it is hardy, brilliantly coloured and easily obtainable. Sticklebacks are probably second in popularity because even the very youngest children can obtain some from the nearest pond and their loss causes few tears; they are expendable.

A few schools keep tropicals but there are many difficulties, in particular the risk of the electric current being switched off at the main by the caretaker or his cleaning staff. I have known many instances of losses happening in this way. Some authorities view with disfavour the use of electrical equipment for tanks owing to the remote risk of fire and the wording of their insurance policies. Inquisitive fingers can play havoc with thermostat controls and chemicals can be added where tanks are situated in science rooms. I remember one case where a whole bottle of hydrochloric acid was tipped into a tank by a boy with a grudge. However, by and large, most school-kept fishes seem to do very well indeed considering that the majority of both teachers and pupils have but a hazy idea of their care and management.

Coldwater fishes have to be kept away from auxiliary heating such as coal fires, stoves and electric heaters and are best away from windows which often get full sun. Glass covers are a must because chalk dust is ever present and injurious. Feeding must be done by the teacher or else enormous quantities of dried foods will be given and a stinking tank will quickly result. Cleaning and topping-up tanks is not always easy. There are too many willing helpers and often the water supply is far distant. Be that as it may, many schools do put on very creditable aquaria displays and I have seen a few school tropical tanks which would have won a prize in almost any show.

Some dealers allow a discount for schools but all too often the teachers who are interested have to manage as best they can with little cash and no outside help. Many clubs have put tanks in hospitals but very few have done the same for their local school. This is something that could very well be considered, and perhaps aquarists who are parents and on parent-teacher committees could do something in this line. Anything for children is worth while.

I am always sorry when I come across a club which does not cater for juvenile aquarists in any way. Perhaps this is where such clubs could help. A reader in Scotland, writing to a magazine for women, tells of the boy in school who wrote: "In spring the sheep have lambs, the cows have calves, the hens have chickens and teacher has tadpoles." I came across a pathetic case recently of ignorance. A young lady teacher told me her fish had died of fungus. As it happened I was able to see the bodies and although they were dead, very dead, I couldn't see anything wrong with them in any way. It seemed, according to her, that the fish had contracted black fungus. I asked her what she had done for this invisible (to me) malady, and she told me she had caught the fish in her hand and rubbed them well with salt. Her last words were: "Father always did it and I have done, but the fish always seem to die, I can't think why."

I never fail to enjoy a visit to Blackpool Tower Aquarium

but on my last visit to this seaside town I did not bother. I was there in March, when the charge for admission was 1s. Judge therefore my surprise to find the charge in August no less than 3s. The Aquarium is much the same and alters little from year to year so I gave it a miss.

From time to time I have heard poor reports of Brighton Aquarium, although it is many years since I last visited it personally. As Brighton is 250 miles away from my home, and as the likelihood of my being in that vicinity seemed remote I wrote to the curator and asked if he would care to let me have any details of interest. By return I was sent a copy of the *Guide and Handbook* (price 1s.). This 52 pages publication is well produced and contains over a hundred drawings and notes on aquarium inmates, and a seven pages write-up of the past history of the Aquarium. There is, however, nothing to indicate how many tanks of fresh-water tropical and marine fishes are on view and a note tells the reader that because a fish is included in the handbook it is no guarantee that it is on view at the time of their visit. The advertising blurb on the back cover describes it as "The world's most famous Aquarium." I wonder what the Americans think of that!

Some time ago I mentioned that the Aquarium at Chester Zoo did not make, perhaps, the most of its opportunities. I called at this Aquarium in late July and was agreeably surprised at the improvement which had taken place. There were some excellent fishes on view including good pompadours, cardinals, tinsel barbs and *Anostomus*. Most of the popular tropicals are on view and there are numerous goldfish, including almost all goldfish varieties such as bubble-eyes and lionheads, etc., and some excellent orfe. The plants are not quite up to the standard one expects from such a large Aquarium as this. Admission is 6d. extra on top of the normal entrance to the zoo. Hobbyists will also enjoy the reptile house, which has some interesting exhibits and is also 6d. extra. A new feature at the zoo is the nocturnal house, where night prowlers are seen under artificial night conditions. The zoo in general is excellent and well worth a visit.

After the fire at Belle Vue, Manchester, many changes have been made there; new animal cages and open-air layouts have been built and fresh amusements provided. The exhibition hall used by the B.A.F. has been extended somewhat. The Aquarium remains unaltered and, since the departure of Mr. G. T. Iles to Canada, few if any new fishes have been added to the collection. A large snapping turtle now occupies the tank which was so long the home of the electric eel.

A new strain of angel fish are reported to have exceptionally long finnage and has been given the name of veiltail angel. I have not seen any of these but pictures which have appeared fail to charm. As far as can be seen the fins are ragged and split and nothing looks worse than a fish with ragged fins. The goldfish has certainly suffered most at the hands of man in his efforts to perpetuate freaks, but few of these "varieties" are pretty and fewer still are hardy. Guppies have also produced exaggerated tails and one or two other tropicals have given rise to "sports" with elongated finnage.

Until quite recently angels were the aristocracy of the aquarium, but during the last year or two the market has



been swamped with weak, badly shaped specimens, which has made the species two a penny. The charm of a good-quality angel has few equals, provided that the fish has a suitably large tank and ample swimming space unimpeded by excess of growth of aquatic plant life. An angel which has constantly to be folding its fins to avoid obstacles looks a poor creature and, in such conditions, does not last very long. In their natural waters there is little vegetation.

Freak angels with elongated finnage will not fit in well with most tanks and if kept with other fishes, will be even more susceptible to injury and damage. The much-boosted black angels never caught on in Britain and I doubt very much if these new monstrosities will fare any better. Fanciers would do more for the hobby if they would concentrate on turning out first-class normal fishes instead of bizarre weaklings. Readers will wonder how it is that one sees so few first-class swordtails (any colour) nowadays, or platys or sail-finned mollies, not to mention the almost complete disappearance of really good fighters. Probably the people who could do this are engaged on trying to turn out square pompadour fish or puffer-faced pencil fish. Let's have swordtails, not sore-tails!

Pumps used for aeration purposes should always be situated above the water level of the tank or tanks they serve as, otherwise, there is a risk of running back when the pumps are switched off. Water running back can ruin a pump of the vibrator type, apart from any mess it may make to the room. Piston pumps usually cannot be damaged by the water running back and seem less prone to this trouble. However, it can happen; it happened to me recently with a pump which I had been using constantly for 10 years without trouble. Put your pump above tank-water level or remove your diffuser and tube when switching off.

The new opaline gourami is a delightful off-shoot from the much better known and more widely kept blue gourami. The newcomer is quite attractive and has much better colour than his more common relative. However, they look their best in bright light and should be given every opportunity to exhibit their flashing coloration. Habits are identical with ordinary blues: they grow quickly, are always hungry and tend to chase each other in a bullying manner. They are not shy; mine will snap up food from under the noses of terrapins several times their size. An unpleasant trait is the everlasting long string of excreta which comes from them; other gouramis are not as bad as this. This new arrival is well worth a try-out in any tank.

The Merseyside Aquarist Society is never behind the times and have found a new way to lure unsuspecting club members to take on stewarding jobs at their fish show. In a recent issue of their fortnightly news-letter they retail aquatic jokes and then continue like this: "If you would like to hear some more funny stories like these let the show secretary know you are willing to act as a steward at the club show—it's an education!"

Talking of Liverpool reminds me of an aquarist in that city who recently performed a hitherto impossible feat. This keen fancier actually spawned a pair of leeri gouramis and the resultant young all turned out to be cherry barb. Please don't write and say you've done something on these lines—is it a record?—most of us have at one time or another. Commonest example is where neon spawning turns into white-cloud mountain minnows. Still, you get a heck of a kick out of it until the realisation dawns.

Although six out of 10 of you readers have television sets, only one in 10 apparently has a refrigerator. Frozen food can be given to your fishes but it is essential to thaw it out

first. If you don't the fishes will pick it up and instantly spit it out and leave it. Refrigerators are useful for keeping our food fresh but fishes are not so particular. Food which seems high or "off" to you is not that way for the fishes, so don't throw it away too soon. They won't suffer any ill-effects, either.

Since my recent remarks about terrapins one or two other points have occurred to me worth mentioning. The elegant terrapin is the tropical variety and when small he is a very elegant fellow indeed in bright green and yellow. This colour does not last, however, and it becomes much more dull as it increases in size. Terrapins are very hearty eaters indeed and want frequent large meals. Given these they grow quickly and become very tame. Scraps from the table will suffice—they will eat almost anything of a meaty or fishy nature. Even dried meat will become edible if soaked for a few minutes. They are no use for ponds in Britain in the weather and temperatures which now make up our summers, and will fail if expected to suffer such climatic extremes. However, in tropical tanks they are quite at home and long-lived. The European terrapin can be kept in ponds in the summer but it hibernates in winter and is a dull fellow compared with his tropical relation.

Fishes can be kept with terrapins but there is a risk. For example, if the fishes have plenty of swimming space, a large tank and adequate food they will do well, but fishes kept with terrapins in close quarters with close-packed plants will suffer. Fishes which normally remain motionless at the surface such as *Apllocheilichthys lineatus* cannot last for long because the terrapins spend a lot of time lying at the surface with head out and make their bed-fellows jumpy. I have never seen terrapins attack a live fish, not even small glowlights, etc., which swim right in front of them, but they will certainly attack a dead fish and make short work of it. Normally they just gulp food down but if there is any difficulty they adopt the method of the crocodile and the piranha in rolling over and tugging, using their weight. They will steal from each other and take food from the mouth of another terrapin if they can, but are otherwise friendly towards their own kind, and even pally. Plants are not damaged much but one species, *Cryptocoryne*, really suffers. The terrapins seem to bite the leaves off near the roots—I have never found out any reason for this.

The Nottingham club have about 22 first-class aquarium and pond books, as well as many booklets, and about 30 bound copies of aquarium magazines dating back roughly 10 years. Many public libraries nowadays have as many as 10 up-to-date aquarium books available and this can help the club librarian. If asked for special books most libraries will reserve them for readers and this way most members of a society will get the opportunity to read what is available in aquarium literature. The trouble is the club library. How can one issue books to members and get them back in a reasonable time?

People have a peculiar attitude to books; they rarely seem to think there is anything unethical in hanging on to what is not their property, or that others may want to read the copy they have put away. If loaned monthly the club member turns up on club night only to find that Mr. Smith isn't coming that night and so has not brought back the book he borrowed 2 months ago. If you call at his house and ask for it you are unwelcome. Then again one hears the whisper . . . "Had the book 3 months and not paid his subs yet . . . it's not fair!" Well, what can you do? Those clubs with sizeable libraries which work well could perhaps tell us how to run a club library efficiently. Most clubs who have tried it out have failed miserably. Let's be hearing from you.

# My Polythene Pond

by RAYMOND YATES

IT was with sorrow and regret that I heard of Mr. A. Boarder's losses from his pond after such a long time of complete immunity. I am not keen on domestic felines and have managed to keep them away by constantly driving them off the property. Cats being brainy creatures soon learn that trespassers get short shrift and the mere rattle of the back-door latch sends them in hurried retreat. Cats being what they are, I think that this is quite an achievement! Cats are also creatures of habit and will always use the same paths and entrance points. If access is made difficult cats will give up the unequal struggle, more particularly if pepper is sprinkled over the area where they habitually enter your grounds. However, like Mr. Boarder, my experience over the years has been that cats present little danger.

## Unexpected Calamity

Readers who read about my polythene pond in the July issue of *The Aquarist* will be sorry to hear that it is now out of commission. When I built the pond I weighed up all the dangers which might beset it and came to the conclusion that polythene measured up to all requirements. How wrong I was. It is so often the unexpected for which we have made no allowances that wrecks our hopes. The pond was a great success until one Sunday evening in the dusk when it was subjected to an attack by "teddy-boys," who flung 17 iron bolts, weighing about 2 lb. each, and some 9 in. long, at the fishes. One of these went right through the bird table, a number went right through the pond and the polythene. Called to the scene in the dim light I realised that the water was escaping, but only slowly, and I had to wait until nearly 2 a.m. before I was able to rescue the fishes. This meant that I had to wade out in gum boots in what was left of the water (about 6 in.), netting the fishes by the light of a taper.

When morning dawned the pond was completely empty and it was seen that the polythene was holed in seven places. I am afraid that this quite knocked the stuffing out of me and I haven't had the heart to bother further with it, because it could all so easily happen again. Of all the accidents which might have come my way anything like this was never contemplated. I moved the smaller fishes to a large tank I had in a shed, but the big goldfish presented quite a problem because they simply cannot be kept in aquaria of less than zoo show-tank size. In the event they had to go in the bath, and there they have remained ever since (more or less), a source of annoyance and inconvenience to us but of wonder to our lady cleaner, who thinks they are adorable.

Visitors have deplored the hooliganism of the modern generation; the police have been twice without any tangible result and the pond stands empty and forlorn. As the poet says: "Of all the words of tongue or pen, the saddest are these, it might have been." I had looked forward to an enjoyable summer with the pond but it was not to be. It would be easy to obtain another sheet of polythene (cost

about £1 10s.) but what could happen once could happen again. I have been wondering if there is anything else in sheet form which would do just as well but which would be proof against such rough treatment as my pond had.

I asked the suppliers if they could suggest any means of repairing damaged polythene which would be waterproof and which would stand the stress and strain of the weight of some hundreds of gallons of water. They stated that it is extremely difficult to repair polythene once it has been split or torn. The only suggestion they made is that the holes be patched with larger pieces of polythene sheeting with a waterproof adhesive compound. Although this does not effect a complete weld of the material it does give a certain amount of adhesion between the surfaces. This should prevent undue leakage. Polythene can only be welded successfully by applying heat and pressure, but this is really a specialised process and could not be carried out by the average amateur.

## Joining Polythene

Two methods of joining polythene to polythene are suggested. One is to use a firm base and cover this with a barrier of cellophane or grease-proof paper. Place the two edges to be welded in position and then cover them also with the barrier. Next run the tip of an ordinary iron set at "rayon" heat along the edges to be sealed. When the material has cooled (in a few seconds) the barrier may be peeled off and a good weld will result. Another method is to place the materials to be joined together between two hard, straight surfaces. Two steel rulers would prove satisfactory. Allow the polythene to protrude about  $\frac{1}{2}$  in. from the edge. Hold the rulers firmly together and run a flame under the edges of the protruding polythene. The edges will melt and curl back to the ruler, welding together as they cool. Do not remove the rulers for a few seconds so that the polythene may completely set.

There is no known adhesive which will stick polythene to metal. Cellotape will hold it in place for a long time but humidity at length affects the adhesion. Rubber-based adhesives (like Bostik) are also reasonably effective.

It might be mentioned here that polythene does not permit the passage of water but it does allow the passage of both oxygen and carbon dioxide and also ultraviolet-light rays. It is quite tough, transparent, easy to cut and simple to store and it is also washable. Quite unaffected by changes of temperature, it can be stored away and used again and again if need be. I was amazed to find that on the bottom of the pond, on the ground side of the polythene, quite a lot of seeds had started growth. I can recommend polythene for garden ponds of small size so long as they are out of reach of the tough element. If you have complete privacy and are in no way overlooked you have a chance.

The other day I visited the pond of a gardener in Cheshire which was quite a dream. Each end of the small pond had 5 ft. high reeds and the centre piece was a huge lily which shared pride of place with an enormous spatterdock a good 24 in. across. The fishes, orfe and goldfish, came to the side to be finger-fed. The owner (a budgie fancier), was safe from feline depredations for the entire garden was wired round with narrow-meshed wire fencing. To see a lovely pond when your own is in ruins is not easy. I think I will try a repair job on the polythene and see what transpires. If it is unsatisfactory, as I expect, I shall not be unduly worried. If the reverse, or the leakage is negligible, I shall be delighted. I will let you know in due course how things turned out.

# In defence of Community Tanks

by MARION BRAUN

WHILST watching my husband dismantling a power-unit, its oblong frame reminded me of an aquarium and I asked him to put glass in and make it into a tank, which he promised to do. As an ex-fisherman from the Baltic Sea, he was also interested in fishes.

We decided soon to study the subject scientifically: borrowed books from the library, drew up lists of plants and fishes and eventually chose a 36 in. tank frame—and Karl would glaze it. Coming from a family where putting a washer on the tap is regarded as a task equal to the construction of the Grand Coolie Dam, I was filled with admiration.

The books were somewhat confusing, so I followed the advice of fish-keeping friends and the dealer when in doubt. The diseases sections in some of the books very nearly put me off but I found, upon enquiry, that very few people ever had anything worse than "ich."

Before deciding on the inhabitants, we went to the Aquarium at the London Zoo and made a long, long list of the fishes we would like to have. We had hopes of cutting this down by going to shops and finding that most were not available. We went to the aquarists' shops—and the list became still longer. Are there any exotic fishes not available in London?

The prices, in most cases only a few shillings, were so tempting. I was able to prove to my satisfaction that one can actually save money with an aquarium. After all, three small angels cost approximately the same as a lipstick.

As soon as the tank was glazed and leak-proof, I disinfected it with salt solution and boiled the compost. As an ex-nurse, I enjoyed this brief return to Lord Lister. Then we went to the cleanest shop I had seen and bought some imitation rock backing, two dozen *Vallisneria*, a large-leaved *Cryptocoryne*, a water wisteria—and was eventually persuaded by Karl, who was afraid that I would buy the whole shop, to plant these first.

My vision of an imitation lake-bed was shattered by the inadequacy of my planting. I quietly went back to the shop and bought large quantities of *Vallisneria*. Generously planted, filled with crystal-clear water and well-lit, the tank looked lovely. "I told you those plants were enough," said my husband.

I carefully pushed small pieces of crushed fertiliser tablet into strategic positions with a rod and after a week the aquarium still looked sparkingly clear and the plants were already growing noticeably. I could imagine fishes just clamouring to be let in.

We decided to buy a pair of common guppies to test its safety. I floated the jam-jar containing two excited little fish on the top of the tank until the temperatures were equal (as instructed) and then let them out. They swam all around and seemed to approve of my efforts. In a few days, they were perfectly settled in, knew their feeding times and were quite tame. The next Saturday morning, we rushed out as soon as the shops opened and came back, not much poorer, festooned in jars.

Not all the fishes we purchased in the first flush of enthusiasm have turned out well—though, of course, some were much better than others. The *Betta* disappointingly ate all the baby livebearers—not one survived. We swop-

ped him for a dwarf gourami which is, to my mind, one of the loveliest fishes in the aquarium.

The guppies contributed a great deal of amusement and liveliness to the scene—especially when one female was about to deliver and all the fishes followed her in line, ready to snap up the delicious morsels. But quite a few escaped. Some of our friends had never heard of viviparous fishes and were pleasantly shocked to learn of their promiscuity, fertility and cannibalistic intentions towards their young.

The swordtails had an irritating tendency to change sex—all my females decided it's a man's world. Considering the hard lot of a female livebearer, one cannot blame them. As soon as the largest female and mother of about 20, started to grow a sword, she or he terrorised the others to such an extent that I removed them all and the kind dealer took them back in exchange for a *Corydoras*.

These beautiful little fishes are a constant interest, and though many aquarists may look down at those who do not go in for breeding, I hope others like me who keep fishes primarily for their beauty will not be discouraged.

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## Our Readers Write

### Public Aquariums

HAVING no knowledge whatever of your correspondent (*The Aquarist*, August) I do not know on what authority he dispenses praise and blame.

Whilst we are principally a Marine Aquarium, we include tropical and coldwater exhibits for the interest of the general public; at no time have we claimed to be putting on a show for the specialist, who is catered for by private shows. I trust that any aquarist on holiday in this part of the country will pay us a visit, however, and should he see anything which he thinks requires attention that he will have the courtesy to see me personally.

Incidentally, our tropical section to-day comprises almost without exception the same fishes as those on exhibition in June; indeed, many were on exhibition in June last year, and judging from their present appearance, will still be with us next year.

H. SINCLAIR,

Director, Torquay Aquarium, Devon.

### Kenya Calling

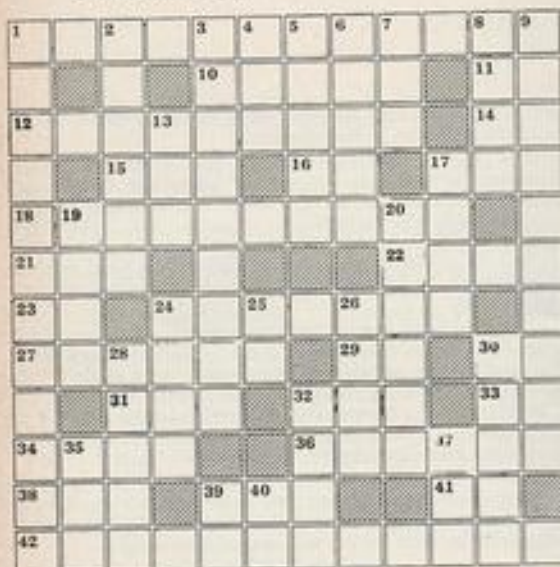
MY committee is anxious to know whether or not any aquarists' clubs or societies in the U.K. which own tape recordings of talks or lectures on tropical fishes and allied subjects would loan them to us at their terms and conditions.

L. W. THORP,

Secretary, The Aquarist Club of Kenya,  
P.O. Box 7779, Nairobi.

# The AQUARIST Crossword

Compiled by J. LAUGHLAND



## CLUES ACROSS

1. First pair of fins, behind gills (8, 4)
10. Better kinds are within R.R. range (5)
11. Roach sighs as fabulous bird leaves it (2)
12. Thick-lipped, blue, dwarf of 6 Down (9)
14. "It —, Beutas?" (2)
15. Cured codfish (3)
16. Royal cypher (1, 1)
17. Less than sober but probably not dry (3)
18. Is this gopeller a *scalare* breeder? (10)
21. None from the Nile (3)
22. And this fish from none (4)
23. Half the tail of the Army? (1, 1)
24. Zulu or jewel fish, for instance (7)
27. Salmon fry (6)
29. Colloquially all right (1, 1)
30. Mixed type (2)
31. Boy is short of a copper to lend (3)
32. Fish eggs (3)
33. After 31 becomes Russian idol (2)
34. Flagflower, a water-garden favourite (4)
36. See sun upset and it follows (6)
38. A good deal of the trout is not in (3)
39. Not the whole area (3)
41. Decoration second only to V.C. (1, 1)
42. Alias garfishes (12)

## CLUES DOWN

1. The colouring of fishes, animals and vegetation (12)
2. Relative to the tail fin (6)
3. Smolt (9)
4. Mammal, but its horn is an aquatic snail (3)
5. Sprite of *The Tempest* (5)
6. One of the gouramies (5)
7. A distinguished fellow (1, 1, 1)
8. Western defence group (1, 1, 1, 1)
9. Hush! Flee from crazy sin of goldfish (10)
13. And run again (3)
17. Nets back for the gun (4)
19. Al. and Vi. go together for the bottle (4)
20. They are sneaks in a way (6)
24. Birds (4)
25. Silent Service (1, 1)
26. Raccoon (4)
28. Best of people or things (5)
30. Portion of pie gets around London postal district (5)
32. Shoal (4)
35. Regret (3)
37. Exclamation of disgust (3)
39. Reg. leaves the cinema but his pal remains (2)
40. Sapper shifts half the shoal (1, 1)

## PICK YOUR ANSWER!

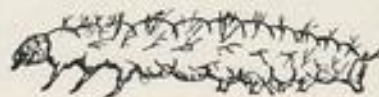
1. "The very gallant officer, the dashing Fung Tze-tu; He called for wine in tasselled jug, and . . . on golden plate." The missing word is: (a) Carp. (b) Crab. (c) Tench. (d) Trout.
2. The genus *Rasbora* is represented altogether by about: (a) 15 species. (b) 25 species. (c) 35 species. (d) 45 species.
3. *Nuria thomasi* is now known as: (a) *Barbus conchanius*. (b) *Epiplatys danicus*. (c) *Notropis hypolepterus*. (d) *Rhinichthys atrinemas*.
4. The striped characin is a popular name of: (a) *Hyphessobrycon*

# FRIENDS & FOES No. 70

## Aquatic Moths



Ringed china moth  
(*Nymphula stratiotata*)  
adult (left) and  
larva (below)



## Lepidoptera (continued)

THIS month is the period during which aquarists should keep a look-out for visitation to their ponds of various china mark moths. They may be fortunate (or unlucky enough, according to one's point of view) to witness the emergence from their ponds of newly hatched moths. To see a perfectly dry creature emerge from a very wet situation is always interesting. It is, of course, the hairs and scales on the insects which render them non-wettable.

I said last month that the moths are white with marbling on the wings. To avoid misleading you I should also add that one of the commonest species is *Nymphula nymphæta*, commonly known as the brown china mark, in which the darker markings exceed the white areas.

Very small brownish males (about  $\frac{1}{2}$  in. wide, by  $\frac{1}{2}$  in. long, when wings are out-stretched) of the "false caddis fly" (*Acentropus niveus*) can be caught flying around near the water's edge or actually pairing on the surface with a female which remains below it. Most females of this particular species bear only rudimentary wings, and do not emerge from the water at all. Pairing takes place at the surface. Thus in this species one sex has a large percentage which is totally aquatic—from egg to and including the imago, whereas the other is only partly aquatic.

The largest caterpillar of the china mark moths is that of the *Nymphula stratiotata*, which confines its attention to the water soldier (*Stratiotes*). This grows to over an inch long, and is of a greenish-yellow colour, and semi-transparent. Over the length of its body are distributed bunches of hair-like tracheal gills. It has spiracles which are not opened until the creature pupates.

C. E. C. Cole

- (a) *bifasciatus*. (b) *Hyphessobrycon heterorhabdus*. (c) *Hyphessobrycon metac.* (d) *Hyphessobrycon scholzei*.
5. *Limia ornata* is native to: (a) Cuba. (b) Haiti. (c) Jamaica. (d) Trinidad.
6. *Trichogaster leeri* (the pearl gourami) was named by: (a) Vlecker. (b) Günther. (c) Pallas. (d) Regan.

G. F. H.

(Solutions on page 433)



## from AQUARISTS' SOCIETIES

Monthly reports from Secretaries of aquarists' societies for inclusion on this page should reach the Editor by the 12th of the month preceding the month of publication.

A TALK on the Breeding and Rearing of Black Angels by Mr. C. A. Allan was the feature of the August meeting of the **Guildford and District Aquarists' Club**. Recent activities have also included a table show judged by Mr. Owen and Mr. C. Allan of North Hants Club and a visit to Mr. B. Rundle's fish house. The next event in the club schedule is an inter-club show with North Hants Club.

FORTHCOMING events in the **Bradford and District Aquarists' Society** programme include lectures by Dr. F. N. Ghadially and Dr. Gust (President of the recently formed Association of Yorkshire Aquarist Societies). At the last meeting Mr. Stanley C. Mitchell of Bingley gave a very interesting illustrated lecture on Arthropods.

THERE is a change of officers in the **Welsh National Aquarists' Society** the chairman now being Mr. L. Reeve. The new secretary is Mr. M. E. Lewis, 5, Wyevean Road, Cathays, Cardiff. Tel.: Cardiff 29647.

AT the last meeting of **Ilford and District Aquarists' and Pondkeepers' Society** the table show was for characins and barbs. Monthly meetings are held by this Society, the hon. secretary being Mr. V. Price, 1a, Horace Road, Barking and interested fishkeepers will be welcomed.

THE new meeting place of the **Kingston and District Aquarist Society** is the Social Centre, Elm Road, Kingston. "Show standards" was the subject of Mr. Peter Hewitt, the speaker at the last meeting.

AT the last meeting of **Bristol Aquarists' Society** the speakers were Mr. R. Sumner, who spoke on prepared foods for aquarium fish. Mr. W. Dallimore's subject was "Balanced Aquaria" and the improvement and creation of new strains of livebearers. The table show for plants was won by Mr. S. J. Davis, Mr. S. Lloyd being second and Mr. G. Stone, third.

THE Newsletter of the **Brookley and District Breeders Circle (Aquaria Society)** again covers a good range of aquatic news and subjects and is quite informative. The breeders' class table show to be held this month is the only really competitive show and should provide some good results.

THE members' annual show of the **Merseyside Aquarist Society** was held recently in the floral marquee of the Liverpool show. The public were greatly attracted by the show stand which consisted of eight furnished aquaria. Prizes were presented by Mr. W. Bailey of the Liverpool Aquaria to the following winners. Furnished aquaria: 1, L. Connell; 2, L. Colvin; 3, B. Roe. Livebearers: 1, F. M. Court (red platy); 2, Mrs. H. Jones (double sword guppy); 3, W. R. Agnew (guppy golden female); Barbs, L. Connell (cumingi); 2, M. Connell (nigiger); 3, M. Connell (tiger). Characins: 1, B. Roe (salmon discus); 2, D. Hughes (neon tetra); Cichlids: 1, D. Jones (*Aplocheilichthys*); 2, D. Jones (fremouth); 3, M. Connell (blue acara). Labyrinth: 1, B. Rimmer (leer gourami); 2, D. Hughes (dwarf gourami); 3, L. Connell (dwarf gourami). A.O.V.: 1, Mrs. B. Kelly (*Epilaxys okapari*); 2, B. Roe (*Aplocheilichthys*); 3, D. Hughes

(coolie loach). Best fish in show: F. M. Court (red platy).

THE results of the **Bedford and District Aquarist Society** open show which was held in conjunction with the Bedfordshire Agricultural show were as follows:—

Individual furnished aquaria—tropical: 1, S. Simons (Kettering A.S.); 2, Mrs. J. Joyce (Independent A.S.); 3, J. Bell (Bedford and District A.S.). Individual furnished aquaria—coldwater: 1, W. H. Sneider (Northampton A.S.); 2, R. R. Pope (Bedford and District A.S.); 3, Miss M. Meads (Bedford and District A.S.). Breeders class—tropical livebearers: 1, J. Krzenek (Coery A.S.); 2, J. Harris (Kettering A.S.); 3, W. E. Donnelly (Bedford and District A.S.). Breeders class—tropical egg-layers: 1, P. C. Tomkins (Independent A.S.); 2, J. Krzenek (Coery A.S.); 3, H. Thompson (Coery A.S.). A.V. Plants: 1, J. Harris (Kettering A.S.); 2, P. Kelly (Bedford and District A.S.); 3, C. Hanchard (Bedford and District A.S.). A.V. Mollie: 1, MacRae (Independent A.S.); 2, B. Abrahams (Bedford and District A.S.); 3, MacRae (Independent A.S.). A.V. Sword-tail: 1, Miller (Bedford and District A.S.); 2, L. Georgsson (Bedford and District A.S.); 3, S. J. Harlock (Northampton A.S.). A.V. Guppy: 1, B. Abrahams (Bedford and District A.S.); 2, B. Abrahams (Bedford and District A.S.); 3, MacRae (Independent A.S.). A.V. Characin: 1, J. Bell (Bedford and District A.S.); 2, J. Bell (Bedford and District A.S.); 3, F. C. Tomkins (Independent A.S.). A.V. Barb: 1, W. E. Donnelly (Bedford and District A.S.); 2, C. P. Hanchard (Bedford and District A.S.); 3, J. Krzenek (Coery A.S.). A.V. Labyrinth: 1, H. Thompson (Coery A.S.); 2, J. Bell (Bedford and District A.S.); 3, H. Thompson (Coery A.S.). A.V. Cichlid: 1, W. E. Donnelly (Bedford and District A.S.); 2, J. Bell (Bedford and District A.S.); 3, S. Simons (Kettering A.S.). A.V. Catfish and Loaches: 1, B. Abrahams (Bedford and District A.S.); 2, J. Bell (Bedford and District A.S.); 3, C. P. Hanchard (Bedford and District A.S.). Carps and Minnows excluding Barbs: 1, J. Bell (Bedford and District A.S.); 2, J. Bell (Bedford and District A.S.); 3, C. P. Hanchard (Bedford and District A.S.). A.V. Goldfish: 1, 2 and 3, R. R. Pope (Bedford and District A.S.). A.O.V. Coldwater: 1, R. R. Pope (Bedford and District A.S.); 2, R. R. Pope (Bedford and District A.S.); 3, G. Booth (Bedford and District A.S.).

A TABLE show was held by **Bath Aquarists Society** of tropical egg-layers. Judges were from the recently formed study group and agreed that the fishes were of first-class quality. Fishes were divided into three classes—Barbs, Characins and A.O.V. 1st and 2nd awards went to E. Challenger in the Barb class for cherry and oligolepis and equal thirds to Mr. A. Burgess (tiger) and E. Challenger (schuberti). Characin class: 1st, 2nd, 3rd and 4th went to Mr. G. Stone for moenkhausia and blind cave fish. A.O.V.: 1st, E. Challenger (*Aphyosemon australe*) and 2nd, Mr. Meads, also with *Aphyosemon australe*; 3rd, Mr. Meads (zebra). The table show cup went to E. Challenger for best fish with the *Aphyosemon australe*. After the judging the panel of judges made up a brains trust.

NO meetings were held during the month of August, but **Paignton Aquarists' Society**

will hold their next meeting on 9th September, 7.30 p.m. in the Zoo restaurant. Full programme for the coming year is available and applications should be sent to H. N. Allies, hon. secretary, c/o Paignton Zoo, Devon.

A MORE comfortable meeting place is the key to the increased membership now being enjoyed by the **Houmslow and District Aquarist Society**. The society now meets fortnightly on Wednesdays and among recent speakers have been Mr. J. E. Edwards, who spoke on low voltage lighting and Mr. Katrinsky, who lectured on plants. A party is being arranged to go to the Hendon Society film show in September, also a visit to McLynn's aquarium at Ewhurst. The secretary is Mr. Worms, 302, Ellerside Road, Houmslow, and the meetings are at the Labour Rooms, 20, Heath Road, Houmslow.

THE attractive residence of Mr. Summers, with its large garden and ponds was the summer meeting place for the **Carassius Club** members. The excellent layout, and the progress of lion-head, twin-tail, orfe, shubunkin and rudd fry was commented upon by members, all of whom are satisfied with this season's results. The best fish bred by each member will be viewed and judged on its merits at the September meeting.

### NEW SOCIETY

THE formation of a new society has been announced, the name being **The Aquarium Circle**. Situated in S.E. London, the Society is not anxious to confine itself to the immediate district, and in keen that membership should be open to all. The aims are to promote the general study of fish and plants and aquatic matters generally, and showing and exhibiting will also be a strong feature. **The Aquarium Circle** has been affiliated to the Association of South London Aquarist Societies and the hon. secretary is Mr. E. A. Shaul, 54, Valminge Court, Perry Vale, Forest Hill, London, S.E.23.

### BRITISH AQUARISTS' FESTIVAL

The 1958 B.A.F. will be held at Belle Vue, Manchester, on the 8th and 9th November. The Competition is to be an Open Inter-Society Show incorporating individual competition by members of entrant Societies. About 20 classes will cover all types of Fish, Furnished Aquaria and Aquascapes and in addition to the trophies there are Cash Prizes.

### MAHARAJAH AQUARIST

THE young Maharajah of Baroda, son of the fabulous Gaekwar, is a keen aquarist. Upon his return to India recently he took with him a tank and 20 tropicals and said that he had a large aquarium at home which he found extremely restful to look at.

### Crossword Solution

P	E	C	T	O	R	A	L	F	I	N	S
I	A	R	A	R	E	R	A	H			
G	O	U	R	A	M	I	E	S	T	U	
M	D	U	N	E	R	S	O	B			
E	V	A	N	C	E	L	I	S	T	U	
N	I	L	E						N	E	O
T	A	A	F	R	I	C	A	N	K		
A	L	E	V	I	N	O	K	P	I		
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O	U	T	A	R	E				G	C	
N	E	E	D	L	E	F	I	S	H	E	S

PICK YOUR ANSWER (Solutions)

1 (a). 2 (b). 3 (b). 4 (b). 5 (b). 6 (a).

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